REMARKS

Claims 12, 13, 15 and 16 currently remain in the application. Claims 1-11, 14 and 17 were canceled. Claim 12 alone is herein amended.

The undersigned attorney apologizes for whatever oversight committed by him in connection with the filing of Preliminary Amendment "C" and Amendment "D" and appreciates the Examiner's spirit of cooperation in which his responses to amendment and arguments have been rendered. In part in view of these responses and the reason for rejection of claims 12, 13, 15 and 16 under 35 U.S.C. 103 over Egan in view of Pettit and Schmider, applicant amends claim 12 herein. This does not mean, however, that applicant agrees with the Examiner's rejection but that applicant found it advisable to thus amend claim 12 to more clearly distinguish the present invention from the cited references.

Applicant firstly addresses to the argument of the Examiner that seems to be saying that one millisecond is only 1/1000 of a second and that the characteristic of the present invention regarding a control in units of milliseconds is nothing but an obvious extension of the prior art technology (by Egan) disclosing a control in units of seconds. Reducing the control unit by 1000 means a change by three orders of magnitude, not a change by a mere few %. Applicant is firmly of the opinion, and requests the Examiner to reconsider, that a change in control unit by three orders of magnitude is not a mere matter of extending the teaching of a prior art technology.

This difference of three orders of magnitude is particularly important within the framework of furnace-type atomic absorption spectrometer because it is the time of atomization that is particularly important. The atomization process usually ends in about one second (while the temperature program is usually set for 2-3 seconds). In view of this time of atomization, it is clear that a control in units of seconds is of little use. It is only because a control is in units of milliseconds according to this invention that an optimum temperature rise characteristic (response characteristic) can be obtained. It is not a mere matter of any three orders of magnitude.

It is further to be reminded that none of the cited references is disclosing or even hinting at reducing the time unit of control from seconds to milliseconds. Egan has disclosed the technology of controlling in units of seconds but merely reducing the units from seconds

to milliseconds would not result in a response waveform (indicial response waveform) which is reduced by 1/1000. There is no such proportionality relationship. The present invention addresses to the problem of how to adjust this characteristic which does not change proportionally. In other words, a mere combination of prior art technologies cannot result in the present invention.

Applicant secondly addresses to the issue of parameters. Schmider was cited by the Examiner for disclosing use of input parameters, but Schmider's parameters are "numerical values for the temperatures, slopes of the temperature ramps, duration of temperature plateaus and gases used during the temperature ramping and plateaus". These "parameters" correspond to what is referred to as the "temperature program" (in page 1 at line 21 and page 3 at line 4, for example) in the specification of the instant application. The "parameters" as recited in claim 12 are different from Schmider's parameters. In order to make this distinction clear, claim 12 has been amended herein to more clearly say that they are for determining response characteristics of the heating control means and that the parameter setting means of claim 12 is adapted to adjust these parameters according to the kinds of elements to be detected such that the indicial response characteristics of the heating control means are controlled (in units of milliseconds). Parameters of this kind according to this invention and thus characterized are not mentioned or even hinted at by any of the cited references.

In summary, applicant is NOT characterizing the invention merely as using a digital PID control on a furnace-type atomic absorption spectrophotometer. The amendment herein introduced in intended to make it clear that the PID coefficients are set according to this invention according to the kind of elements to be detection and measurement conditions such that the detection characteristics are improved (if not optimized). It is believed that the present invention as characterized by claim 12 is not obvious by random consideration of teaching of the cited references.

For the sake of completeness, the cited references are analyzed below although some of the points have already presented.

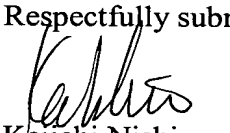
Egan discloses an analog circuit while the present invention relates to a digital control. Although applicant is not intending to argue that this difference is crucial, it should

be noted that a digital control makes it easier for the operator to change the indicial response characteristics. Although response characteristics can be fixed changed for each of the drying, ashing and atomization stages by an analog control, they can be changed according to the present invention also according to the kind of elements to be detected and measurement conditions. Indeed, Egan does not really relate to the PID control and the expression PID control is not even mentioned in Egan while the present invention takes full advantage of the PID control.

Pettit discloses a PID control on the power supply to an electrical load and to optimize the PID parameter but there is no guarantee what good result can be obtained by applying Pettit's method to a furnace-type atomic absorption spectrophotometer.

It is therefore to be concluded that the cited references, even if considered in combination, cannot lead a reader readily to the technology of the present invention as clearly delineated by amended claim 12 and hence claim 12 and the claims dependent therefrom should be deemed allowable.

Respectfully submitted,



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